

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

or hydroxycarboxylic acid or transesterification of a lower aliphatic ester of an aromatic dicarboxylic acid or hydroxycarboxylic acid with an aliphatic diol and subsequent polycondensation".

In claim 10, line 3, delete "which can be".

In claim 11, line 7, delete "derivatives thereof" and insert therefor -- the esters of such acids --.

In claim 12, line 7, delete "derivatives thereof" and insert therefor -- the esters of such acids --.

In claim 14, line 5, delete "derivatives thereof" and insert therefor -- the esters of such acids --.

In claim 16, line 2, delete "10" and insert therefor -- 28 --.

ADD NEW CLAIMS 27-29:

27. The process as claimed in claim 1 further comprising the esterification of a hydroxycarboxylic acid or transesterification of a lower aliphatic of a hydroxycarboxylic acid with an aliphatic diol and subsequent polycondensation.

28. A heat-stable, antimony-free polyester of neutral color based on an aromatic dicarboxylic acid and an aliphatic diol prepared by the process as claimed in claim 27, in which, in the non-matted state, its color number components are

a\* in the range from -3 to +3,

b\* in the range from -6 to +6 and

L\* in the range from 55 to 75.

- B's  
Cont.
29. The process as claimed in claim 1, wherein the titanium compound is potassium titanyloxalate.
- 

I. SUMMARY OF AMENDMENTS TO CLAIMS

Claims 1, 11, 12 and 14 have been amended by the deletion of the phrase "derivatives thereof" which has been replaced with -- the esters of such acids --. Support is provided by the specification in the paragraph bridging page 7, line 36, and page 8, line 7.

Claims 6 and 22 have been amended by the deletion of the phrase "compounds which donate crosslinking structural groups" which has been replaced with -- crosslinking agents --. Support is found in the specification at page 9, lines 3-8.

New claim 27 has been added to clarify that the process of claim 1 further comprises the optional esterification of a hydroxycarboxylic acid or transesterification of a lower aliphatic of a hydroxycarboxylic acid with an aliphatic diol. Support is provided by original claim 8 that discloses that 0 to 20% of an aromatic hydroxycarboxylic acid of the formula IV, or a lower aliphatic acid ester thereof, is esterified or transesterified. Claim 8 has been amended to avoid any redundancy with new claim 27 and the dependency of claim 8 has been changed from claim 1 to new claim 27.

Claim 10 has been amended by the deletion of the phrase "which can be".

New claim 28 has been added to expressly claim the polyester product of the process of new claim 27, which process was originally disclosed by claim 8. Support

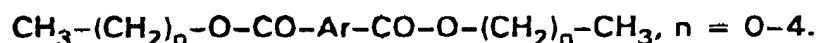
for new claim 28 is provided by the specification at page 13, lines 1-10. The dependency of claim 16 has been changed from claim 10 to new claim 28.

Support for new claim 29 is found in the Examples.

## II. REJECTIONS UNDER 35 U.S.C. §112

In Paragraph 15 of the Office Action, claims 1, 6, 8-12, 14, 16 and 22 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention.

Claims 1 and 8 recite transesterification "of a lower aliphatic ester of an aromatic dicarboxylic acid". It is alleged that the recitation is confusing and/or indefinite. Applicants' usage of the phrase "lower aliphatic ester of an aromatic dicarboxylic acid" has the art recognized meaning, i.e.,



Support for this meaning is found in one of the references cited by the Examiner. Therefore, the Examiner's attention is directed to U.S. Patent No. 4,131,601 to Hashimoto et al. at col. 3, lines 13-15. Accordingly, Applicants submit that the objected phrase, as it appears in claims 1 and 8, is neither confusing nor indefinite, but is readily recognized and understood by the person of ordinary skill in the art.

Claims 1, 11, 12 and 14 recite "a complexing agent selected from the group consisting of phosphoric acid, phosphorous acid, phosphonic acid and derivatives thereof". It is alleged that the phrase "derivatives thereof" is indefinite. The objected phrase has been deleted from the claims and replaced with the phrase -- the esters

of such acids --. Support is provided by the specification in the paragraph bridging page 7, line 36, and page 8, line 7.

Claims 6 and 22 recite "compounds which donate crosslinking structural groups". This phrase has been deleted from claim 6 and 22 and has been replaced with the phrase -- crosslinking agents --. Support is found in the specification at page 9, lines 3-8.

The phrase "can be prepared" has been deleted from claim 10.

In view of the foregoing amendments, withdrawal of the rejection of claims 1, 6, 8-12, 14, 16 and 22 under 35 U.S.C. §112, second paragraph, is respectfully requested.

In Paragraph 16 of the Office Action, claims 8, 9 and 16 are rejected under 35 U.S.C. §112, fourth paragraph, as being of improper dependent form for failing to further limit the subject matter of a previous claim.

The process of new claim 27, which is dependent on claim 1, is directed to the optional esterification of a hydroxycarboxylic acid or transesterification of a lower aliphatic of a hydroxycarboxylic acid with an aliphatic diol. The dependency of claim 8 has been changed to new claim 27. Furthermore, the dependency of claim 16 has been changed to new claim 28 which claims the polyester product prepared by the process of new claim 27.

In view of amended claims 8 and 16 and new claims 27 and 28, withdrawal of the rejection under 35 U.S.C. §112, fourth paragraph, is requested.

### III. REJECTIONS UNDER 35 U.S.C. §102(b) AND (e)

In Paragraph 17 of the Office Action, claims 1-26 are rejected under 35 U.S.C. §102(b) as allegedly being anticipated by U.S. Patent Nos. 4,208,527 and 4,131,601 to Horlbeck et al. and Hashimoto et al., respectively. In Paragraph 18 of the Office Action, claims 1-26 are rejected under 35 U.S.C. §102(e) as allegedly being anticipated by U.S. Patent No. 5,340,907 to Yau et al. It is alleged that the prior art processes have features and characteristics essentially as claimed.

The claimed invention is directed to a two-step process for the preparation of heat-stable antimony-free polyesters of neutral color (process claims 1-9, 21-24, 27 and 29). Also claimed are the polyester products prepared by the claimed process (product claims 10-20, 25, 26 and 28). The two-step process comprises (1) an esterification of an aromatic dicarboxylic acid or transesterification of a lower aliphatic ester of an aromatic dicarboxylic acid with an aliphatic diol and (2) polycondensation. Different catalysts are employed for each of the two reaction stages:

STAGE	CATALYST
I. ESTERIFICATION OR TRANSESTERIFICATION	► transesterification metal catalyst, preferably Mn
II. POLYCONDENSATION	► complexing agent selected from the group consisting of phosphoric acid, phosphorous acid, phosphonic acid and their acid esters  ► Co compound  ► Ti compound, preferably potassium titanyloxalate

The cited prior art is similarly directed to processes for the manufacture of high molecular weight PET in two stages, i.e, esterification or transesterification

and polycondensation. The cited art expressly teaches that different catalysts are used for each of the reaction stages and that the combination of catalysts effectively determines the essential characteristics of the reaction and the polyester product. In this regard, the Examiner's attention is directed to the following prior art disclosures: U.S. Patent No. 4,208,527 at col. 1, lines 37-52; U.S. Patent No. 4,131,601 at col. 1, lines 31-33; and U.S. Patent No. 5,340,907 at col. 1, lines 54-61.

Therefore, in view of the prior art, it is apparent that the combination of catalysts and the manner in which they are combined for each of the two stage reactions is critical. By way of summarizing the cited prior art, Applicants have prepared the Table below which sets forth the combination of catalysts used in the prior art processes:

STAGE	CATALYST			
	CLAIMED INVENTION	'527 PATENT HORLBECK	'601 PATENT HASHIMOTO	'907 PATENT YAU
I. ESTERIFICATION OR TRANS- ESTERIFICATION	<ul style="list-style-type: none"> <li>▶ transesterification metal catalyst, preferably Mn</li> </ul>	<ul style="list-style-type: none"> <li>▶ Mn</li> <li>▶ Co (col. 3, lines 3-10)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Mn</li> <li>▶ Co (col. 3, lines 19-34)</li> <li>▶ Ti (col. 4, lines 46-53)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Mn and/or Zn</li> <li>▶ Ti (col. 2, lines 61-68)</li> </ul>
II. POLY- CONDENSATION	<ul style="list-style-type: none"> <li>▶ complexing agent selected from the group consisting of phosphoric acid, phosphorous acid, phosphonic acid and their acid esters</li> <li>▶ Co compound</li> <li>▶ Ti compound, preferably potassium titanyl xalate</li> </ul>	<ul style="list-style-type: none"> <li>▶ P</li> <li>▶ Ge</li> <li>▶ Ti (col. 3, lines 10-31)</li> </ul>	<ul style="list-style-type: none"> <li>▶ Ti (col. 3, lines 3, lines 35-40)</li> </ul> <p>- P</p>	<ul style="list-style-type: none"> <li>▶ P</li> <li>▶ Co (if used) (col. 2, lines 61-68)</li> </ul>

As demonstrated by the above Table, the combination of catalysts employed in the claimed process and the manner in which they are combined in the two stage reaction are different from the cited prior art. Moreover, none of the references teaches the distinguishing feature that the cobalt compound, which is added after transesterification, is not completely complexed. Applicants have discovered that the partial deactivation of the cobalt compound surprisingly leads to a drastic improvement in reproducibility and rates of polycondensation (specification, page 7, lines 15-18). Therefore, if the claimed process is different, then the claimed polyester product is likewise different from the prior art.

Accordingly, since each feature of the claimed invention is not disclosed within the four corners of any of the cited references, the rejections under 35 U.S.C. §102(b) and (e) are improper and withdrawal thereof is respectfully requested.

### CONCLUSIONS

Applicants submit that the amendments and accompanying remarks are responsive to the Office Action. Allowance of claims 1-29 is respectfully requested.

Respectfully submitted,



John M. Genova  
Reg. No. 32,224

April 22, 1996  
Hoechst Celanese Corporation  
86 Morris Avenue  
Summit, New Jersey 07901  
(908) 522-7810